

AMENDMENTS TO THE SPECIFICATION

Please replace the first paragraph on page 2 of the specification with the following amended paragraph:

The present invention relates generally to graphical rendering systems and more particularly to a system, apparatus, process and article of manufacture for providing improved interactive, graphical applications using, for example, ~~Macromedia Flash™~~ MACROMEDIA FLASH® technology available from Macromedia Inc., the Extensible Markup Language (XML) language and the Mathematical Markup Language (MathML).

Please replace the second paragraph on page 2 of the specification with the following amended paragraph:

Details of ~~Macromedia Flash™~~ MACROMEDIA FLASH® technology, including preferred software and hardware environments, can be found in various sources such as: Macromedia's website, ~~<http://www.macromedia.com[[>]]~~, conference notes from ~~FlashForward~~ FLASHFORWARD® and Macromedia Ucon; in several books published, for example by Friends of Ed, O'Reilly & Co. and Macromedia; articles and user forums on websites such as We're Here, FlashKit, UltraShock, and Figleaf's FlashCoders.

Please replace the third paragraph on page 2 of the specification with the following amended paragraph:

Details of XML and MathML, including preferred software and hardware environments, can also be found in various sources including the W3C's website, <http://www.w3c.org>. Specifically, the current MathML specification entitled, "Mathematical Markup Language (MathML) Version 2.0," is located at <http://www.w3.org/TR/2001/REC-MathML2-20010221>.

Please replace the third paragraph on page 3 of the specification with the following amended paragraph:

Current web browsers, e.g., ~~Internet Explorer™~~ INTERNET EXPLORER®, ~~Netseape™~~ NETSCAPE®, etc., display stylized text and graphics/images however, only a few lesser known web browsers contain native MathML support, thereby limiting use.

Please replace the fourth paragraph on page 3 of the specification with the following amended paragraph:

Another technique involves manually generating the entire multimedia layout using a graphical creation and rendering program such as ~~Maeromedia~~ Flash MACROMEDIA FLASH® MX™ development tool by Macromedia, Inc. However, manual layout is acutely impractical due to high development costs and the severe constraints placed on maintainability, scalability and portability.

Please replace the first paragraph on page 4 of the specification with the following amended paragraph:

~~The Macromedia Flash Player~~ MACROMEDIA FLASH® PLAYER™
and its associated Flash Plug-in FLASH® PLUG-IN™ display stylized text that is
formatted as a Hypertext Markup Language (HTML) object. However, such an
arrangement offers no integration with graphics or mathematical expressions.

Please replace the third paragraph on page 4 of the specification with the following
amended paragraph:

The present invention solves the aforementioned limitations of the prior
art. Specifically, the present invention is a comprehensive solution for effectively
arranging and rendering multimedia information comprising mixed data types
including: text, graphics, animations, video and mathematical expressions. The
mixed data may be displayed in various sizes and formats and is in a portable and
maintainable format. In addition, there is support for certain technologies, such as,
~~Macromedia Flash™~~ MACROMEDIA FLASH®, multilingual and Unicode
support, and client-server n-tier implementations. Furthermore, performance and
costs are kept at acceptable levels.

Please replace the first paragraph on page 7 of the specification with the following
amended paragraph:

It will be appreciated that the system, method of operation, data object and
computer product described herein may vary as to the details without departing
from the basic concepts disclosed herein. Moreover, numerous specific details
are set forth in order to provide a more thorough description of the present

invention. However, all specific details may be replaced with generic ones. Furthermore, well-known features have not been described in detail so as not to obfuscate the principles expressed herein. While exemplary embodiments of the present invention described herein is specifically directed to a ~~Macromedia Flash~~ MACROMEDIA FLASH®-XML-MathML based environment, the invention is not limited thereby as one skilled in the art can readily adapt the concepts presented herein to a preferred environment. Therefore, other suitable and equivalent programming languages, platforms and architectures, etc. fall within the scope of the present invention.

Please replace the second paragraph on page 8 of the specification with the following amended paragraph:

FIGS. 1A & B generally depict an advanced versatile layout and rendering system 700 in accordance with the teachings expressed herein, comprising, but not limited to, a bus 705 that allows for communication among at least one processor 710, at least one memory 715 and at least one storage device 720. The bus 705 is also coupled to receive inputs from at least one input device 725, e.g., mouse, keyboard, pen, pad, etc., and provide outputs to at least one output device 730, monitor, printer, other display medium, etc.. The at least one processor 710 is configured to perform the techniques provided herein, and more particularly, to execute the following exemplary computer program product embodiment of the present invention. Alternatively, the logical functions of the computer program product embodiment may be distributed among processors connected through

networks or other communication means used to couple processors. The computer program product also executes under various operating systems, such as versions of Microsoft Windows™ MICROSOFT WINDOWS®, Apple Macintosh™ APPLE® MACINTOSH®, UNIX, etc.

Please replace the first paragraph on page 9 of the specification with the following amended paragraph:

The present invention may be implemented as a computer program product (also referred to as “QD module”) that is developed for and implemented in the Macromedia Flash™ MACROMEDIA FLASH® environment as, e.g., a Flash™ FLASH® client application code module. The QD module in conjunction with a Super-Versatile-Text Display sub-module (also referred to as “SVT module”) (described below) effectively present multimedia information on a display output device.

Please replace the second paragraph on page 9 of the specification with the following amended paragraph:

FIG. 2 displays an exemplary data format utilized by the QD module in accordance with the present invention. That the depicted layout and data are necessarily defined by the environment in which they are used will be apparent to those skilled in the art. In one embodiment, the QD data format is implemented as an XML object, an open web standard that is understood by a Flash™ FLASH® application. The QD data format preferably uses Unicode as the

character encoding, which allows for a huge character set, including most languages and math symbols. The QD data format also allows for and intermingles styled text, such as italics, bold, etc., graphics, and mathematical expressions, symbols and other indicia. The graphics may be defined as standard JPEG files or as Flash FLASH® SWF™ files and can be animated or interactive. Mathematical expressions are defined as MathML, an open standard based on XML, which can be imported and exported by most math software products.

Please replace the fourth paragraph on page 10 of the specification with the following amended paragraph:

At 303, the system displays the question text as a Flash™ FLASH® data block.

Please replace the first paragraph on page 11 of the specification with the following amended paragraph:

At 304, the system displays potential answer(s) to the main question as a Flash FLASH™ data block;

Please replace the third paragraph on page 11 of the specification with the following amended paragraph:

At 306, the system displays the Visual Aid as a Flash™ FLASH® data block and processing continues to 307.

Please replace the fifth paragraph on page 11 of the specification with the following amended paragraph:

At 308, the system saves the Descriptive Solution for later display as a Flash™ FLASH® data block and processing continues to 307.

Please replace the first paragraph on page 35 of the specification with the following amended paragraph:

Each program is preferably implemented in a high level procedural or object oriented programming language to communicate with a computer system, however, the programs can be implemented in assembly or machine language, if desired. In any case, the language may be a compiled or interpreted language. In one embodiment, the present invention is implemented in the ActionScript ACTIONSCRIPT® programming language for use in the Macromedia Flash™ MACROMEDIA FLASH® environment. The program code uses Macromedia Flash MACROMEDIA FLASH® MX™ to publish, Macromedia Flash Player MACROMEDIA FLASH® PLAYER™ (e.g., Version 6, Release 48 ,or better) to execute and utilizes the Macromedia MACROMEDIA® piiloader and timeQueue code modules.

Please replace the first paragraph on page 36 of the specification with the following amended paragraph:

The description of the exemplary embodiment herein assumes knowledge of Macromedia Flash™ MACROMEDIA FLASH® and ActionScript™

ACTIONSCRIPT® programming language and a general understanding of programming documentation conventions. Understanding of layout and design issues, such as page layout for the web or for print, and especially as regards the layout of mathematical expressions, will also be useful.

Please replace the first paragraph on page 37 of the specification with the following amended paragraph:

Finally, an embodiment of the present invention having potential commercial success is integrated in the Planetii™ PLANETH® Math System MATH SYSTEM™, an online math education software product, available at [<http://www.planetii.com/home/\[\]>\[\]](http://www.planetii.com/home/[]>[]).